3140 Finley Road
Downers Grove, IL 60515
630.795.3200
Fax: 630.795.1130

June 14, 2005

Mr. Kevin Turner
USEPA REGION V
Emergency Response Branch
8588 Rt. 148
Marion, IL 62959

Mr. Steven Faryan
USEPA REGION V
Emergency Response Branch
HSE-5J
77 West Jackson Blvd.
Chicago, IL 60604-3590

Clayton Project No. 15-03095.16-001

Subject: **ILR000128249 – Madison County – LPC 1190505040**
The Hartford Area Hydrocarbon Plume Site
Hartford, Illinois
Response to Comments
Technical Memorandum for LNAPL Remedy Selection Process

Dear Messrs. Turner and Faryan:

This letter has been prepared in response the May 9, 2005 comments on the Technical Memorandum, Remedy Selection Process dated March 9, 2005. The Agency comments are presented in the order presented in the May 9, 2005 letter followed by the Hartford Working Group (HWG) responses in italics.

RESPONSE TO COMMENTS

The figures in this document plot 1 foot or greater contours of LNAPL thickness. The agencies request that maps be produced showing any LNAPL thickness greater than 1-2 inches and that recovery efforts focus on those areas.

***Response**: The maps that have been produced previously and continue to be generated based on monthly groundwater and LNAPL elevation measurements adequately depict the presence of LNAPL within the limits of the Village of Hartford. The 1-foot contours used also include a zero line delineating the extent of measurable LNAPL. This defines the areas where LNAPL recovery will be evaluated.*

The first paragraph of Section 1 of the memorandum states in part, "…The AOC requires that vapors, liquid LNAPL and groundwater be addressed as part of the active recovery design." The Agencies feel that the selection of SVE as the primary remedy is not consistent with the AOC and that pilot studies and design of an active recovery system to recover free product (any detectable LNAPL thickness) should proceed expediently in North Hartford.

Response: *SVE is the initial remedy proposed for continuous service that will address liquid LNAPL and vapors. However, SVE was not presented as the only method for LNAPL removal.*

The HWG is currently moving forward with the SVE system due to its ability to mitigate vapor intrusion, but also recognizes that vapor recovery in the Village of Hartford will assist in the removal of LNAPL. The Technical Memo noted that additional pilot testing would be conducted to evaluate other mobile liquid LNAPL removal methods for potential implementation concurrently with SVE. More specifically, the HWG is currently testing High Vacuum Remediation (HVR) at a series of wells within the Village that have been identified within the areas of apparent high LNAPL thickness within the wells.

In addition, soil core samples will be collected from various locations within the LNAPL plume so that LNAPL saturation characteristics can be determined. This information will then be used in an API predictive recovery model to evaluate various mobile LNAPL removal methods to determine if additional pilot testing may be warranted.

Demonstrated uses of this Active Recovery technology are documented below:

1) A groundwater pump and treat system coupled with a product recovery system is in operation at the Conoco-Phillips refinery located east of the village of Hartford. A report was submitted January 14, 2005 indicating over one million gallons of free product had been recovered by this system between July 1, 2004 and December 31, 2004; the maximum reported thickness of free hydrocarbon in the area where the recovery system is in operation was 3 feet of product. This system is installed in the American Bottoms aquifer, which is the same aquifer as the "Main Sand" in the village of Hartford.

2) A groundwater pump and treat system coupled with a product recovery system is also in operation at the former BP refinery north of the village of Hartford. Reports submitted indicated that more than 283,000 gallons of free phase hydrocarbon were recovered by this system during 2004; the maximum reported thickness of free hydrocarbon in the area where recovery system is in operation was approximately 2'. This system is installed in the American Bottoms aquifer, which is the same aquifer as the "Main Sand" in the village of Hartford.

Response: *It should be noted that Conoco-Phillips had to pump over one billion gallons of groundwater to recover over a million gallons of free product and that BP had to pump over 705 million gallons of groundwater to recover 283,198 gallons of free product. This equates to a return of 0.1% (0.001 gallons of free product recovered per gallon of groundwater pumped) in the case of Conoco-Phillips and 0.04% (0.0004 gallons of free product recovered per gallon of groundwater pumped) in the case of BP.*

The current pump and treat systems in place at the referenced facilities are achieving LNAPL recovery but at the expense of enormous volumes of groundwater withdrawal that require extensive treatment systems and appropriate discharge points into water bodies that can handle this discharge volume. Furthermore, the pump and treat systems may be creating significant smear zones that will entrain NAPL in deeper zones that may represent long-term sources of groundwater contamination.

Specific Comments:

Comment 1: Section 1.0, Page 1-1, first paragraph: The text states that soil vapor extraction (SVE) will be the primary component of the LNAPL removal. SVE is not recommended for LNAPL removal as the mass transfer from the liquid to vapor phase is typically a much less efficient and slower mass transfer mechanism than direct, liquid phase LNAPL removal (API 2004, USACE 1999, and USACE 2002).

Response: *As indicated previously, SVE is not the only technology being evaluated for use in the Village of Hartford. It is anticipated that SVE will be augmented with other LNAPL removal approaches. This may include the use of multiple technologies or multiple variations of a few technologies that generate the most efficient recovery of LNAPL from the site.*

While SVE is effective in removing residual-phase LNAPL and has numerous other benefits such as improved biodegradation and sub slab vapor control, the agencies are not aware of the use of SVE will be the primary mobile free-phase LNAPL recovery technology at any similarly-sized free-phase LNAPL site. Furthermore, it appears to be presumptuous to select SVE as the primary recovery technology when other proven LNAPL recovery technologies have yet to be adequately evaluated. The text should be revised to explain that SVE is the primary technology to control hydrocarbon vapor migration and to mitigate residual LNAPL in vadose zone soils, while other technologies will be employed for free phase mobile LNAPL recovery.

Response: *More precise wording should have been utilized in the Technical Memo to identify that SVE is the primary mechanism to control vapor migration and to mitigate vadose zone LNAPL, whether residual or mobile. In addition, SVE will contribute to LNAPL removal throughout the plume. However, as proposed in the Technical Memorandum, other technologies such as HVR are being pilot tested to determine their appropriateness primarily for mobile LNAPL removal at the site in the most efficient fashion while minimizing neighborhood impacts. The potential for other remedy*

technologies to be applied will be evaluated upon review of additional LNAPL characterization, HVR results, and transport modeling.

It must also be noted that the estimated amount of free product to be removed by the vapor extraction system is within the zone of influence of the SVE wells only. The proposed SVE expansion does not cover the whole area of North Hartford affected by free product.

Response: *This statement is correct in that mass removal will only occur within the influence of the SVE system. However, it is incorrect to state that SVE does not cover the entire North Hartford area where LNAPL is present. The Technical Memo did not indicate that the SVE system was complete and would not cover all of North Hartford. Monitoring of the SVE system is being conducted to determine the actual influence of the SVE system and plan for SVE system expansion as necessary.*

HVR is being pilot tested at selected wells throughout the LNAPL plume in Hartford. Selection and implementation of the final remedy for the site will be based upon the results of these pilot tests in conjunction with other data being collected and other applicable pilot tests. The final LNAPL remedy will be based on the appropriate technology selection throughout the plume that represents the most efficient technology application for a given area based upon the complex interaction of multiple water and LNAPL bearing zones, recurring water level fluctuations, varying product nature, and varying LNAPL mass distribution.

Comment 2, Section 1.0, Page 1-1, second paragraph: Section 1.0 states that the volatile nature of the LNAPL (i.e. lighter end hydrocarbons) provides the appropriate environment for LNAPL removal through vapor extraction. While it is true that lighter end hydrocarbon are more amenable to removal by SVE, the ROST data for the site suggests that a substantial percentage of the LNAPL consists of diesel and heavier range hydrocarbons. Removal of diesel and heavier range hydrocarbon LNAPL by SVE is unlikely to ever achieve complete LNAPL recovery.

Response: *We agree that SVE will not remove significant fractions of the heavier petroleum constituents. However, LNAPL samples collected from various locations within the plume identified that the LNAPL was between gasoline and diesel based on simulated distillation results. Additional LNAPL sampling is planned throughout the LNAPL plume to identify areas that may contain heavier petroleum constituents.*

As indicated in the Technical Memo, additional pilot tests are being conducted in wells throughout the plume to determine the appropriateness of HVR and other technologies to remove mobile LNAPL.

Even removal of kerosene range hydrocarbon LNAPL is an extremely slow process likely to require 10 years or more. In addition, reported spills in the area indicate that crude oil, # 6 oil, and refined oil that was pumped into the heated pipelines running through North Hartford were released from pipelines, tanks, and from the refining operations. Physical observations were noted of heavy end hydrocarbon releases along the pipeline on Elm Street when it was excavated and repaired. The number of samples collected and analyzed with simulated distillation is inadequate to characterize this spill as primary gasoline and diesel mixture. In addition to simulated distillation, U.S. EPA requests that the samples be analyzed for Gasoline Range Organics, Diesel Range Organics and fingerprinting to match heavy end products.

Response: *LNAPL in wells across the site will be sampled and analyzed for a variety of parameters to include GRO, DRO, typical species fingerprinting, density, viscosity, and interfacial tension. A list of wells is currently being developed and will be provided to the Agency prior to sampling.*

Comment 3, Section 1.0, Page 1-1, third paragraph: Section 1.0 states that the SVE system will remove 50,000 gallons of LNAPL per month using a system flow rate of 2,250 scfm and a 60,000 ppbv concentration. The agencies believe this to be an overstated calculation. Using the TPH removal rate calculation provided in Appendix E of the Hartford Community Center SVE Pilot Test, dated March 30, 2005, $Rr = Cv \times Q \times MW \times 1.581 \times 10^{-7}$, where:

Rr = Removal rate in pounds per day (lb/hr)

Cv = TPH concentration in ppmv

Q = air flow rate in scfm

MW = molecular weight of gasoline (assumed to be 66)

Using the information provided on page 1-1, the estimated removal rate calculates to Rr = (60 ppmv) x (2250 scfm) x (66) x (1.581×10^{-7}) = 1.41 lbs/hr. Assuming a specific gravity of 0.73, this removal rate converts to 170 gallons per month, well below the 50,000 gallons per month as stated. Please re-check the calculation, and prepare to discuss at our technical meeting.

Response: *We regret that the Technical Memorandum contained a typographical error in that the 60,000 ppbv reported as the basis for the removal calculations should actually have been 60,000 ug/m3 or 17,000 ppmv. Enclosed please find a copy of the laboratory report from the SVE pilot test (enclosed). Based on the concentration of 17,000 ppmv of TPH as gasoline, the expected system mass removal would be 71,518 gallons/month at a flow rate of 2,250 scfm, specific gravity of 0.73 and a molecular weight of 100.*

Using the above-listed formula and back-calculating for the TPH concentration, it appears that the 50,000-gallon per month estimate was based on an influent vapor concentration of 18,000 ppmv. This assumption likely overestimates the TPH removal rate for two reasons (1) the average vapor concentrations are likely to be lower and (2) the SVE influent concentration typically decrease rapidly after system startup. These topics are discussed further in the following paragraphs.

Response: *The projection of monthly mass removal was based on a consistent influent concentration to the treatment system. Although it is expected that the concentrations will eventually decrease, recent samples collected from the system do not show any significant drop at this time. Laboratory reports from two sampling events are enclosed. On April 21, 2005 the influent concentration was 17,000 ppmv of TPH as gasoline and 11,000 ppmv of TPH as gasoline on May 11, 2005. Using the concentration data from these samples, the mass removal from the system is between 71,500 and 46,200 gallons/month.*

Actual average vapor concentrations: Although the SVE pilot test recorded influent concentrations of 43,000 ppmv, 49,000 ppmv, and 36,000 ppmv at well HMW-46A, much lower influent TPH concentrations of 4,700 ppmv and 4,500 ppmv were noted at well HSE-20. Analysis of the vapors collected during the MPE testing (MPE is essentially high-vacuum SVE), indicated even lower TPH concentrations (21 and 42 ppmv at RW-3, 250 and 430 ppmv at RW-4A, and 160, 40, and 53 ppmv at RW-5).

Thus, it is likely that the average influent TPH concentrations at the site will be significantly lower than the assumed 18,000 ppmv TPH influent concentration. Please recalculate SVE system removal rate using an average TPH concentrations based on real data which is currently being collected on the expanded SVE system.

Response: *Revised mass removal calculations were presented in the response above. To monitor the SVE system performance, air samples from the SVE system influent (prior to dilution air) and the influent of the temporary treatment system at the Community Center are being collected 3 times per week. As this data becomes available, mass removal calculations will be made and the information presented to the Agencies.*

Exponential decay of vapor concentrations: SVE TPH removal rates decay rapidly within in a few months, as available residual LNAPL is volatilized and removed (USACE 2002). While it is true that the continued presence of free-phase LNAPL will provide a continued source of TPH vapors, the surface area of the free-phase LNAPL will still be significantly less than the surface area of the residual LNAPL in the smear zone, and as a result, TPH removal rate will decay to this steady state condition. The estimation of a 50,000-gallon per month removal rate does not take decay into account, as it appears to be based on initial TPH removal rates. Please revise the calculations to take TPH removal rate decay into account, based on modeling results, existing site SVE data, or similar sites.

Response: *We agree that SVE TPH removal rates will decay through time. The anticipated decay for the site is partially offset by the conservative utilization of 17,000 ppmv as the base extraction rate instead of the much higher values that have been obtained at the site (up to 26,000 ppmv). Because the SVE system is still in the process of being expanded, mass removal rates will be monitored over the course of the next six months to determine trends in influent concentrations and calculate site-specific vapor phase extraction decay rates. Such data will reflect seasonal variations at the site and will provide a much stronger basis for predictive cleanup rates as opposed to modeling, standard assumptions, or other sites.*

Comment 4, Section 1.0, Page 1-1, third paragraph: Calculations in the SVE and MPE test reports assume a hydrocarbon molecular weight of 66. Please provide the basis for this assumption, as typical published molecular weight values for weathered gasoline are usually around 100. This will increase the estimated TPH removal rates.

Response: *A molecular weight of 66 was utilized in the previous calculations in order to be conservative in removal estimates. Revised calculations presented previously in this response letter and all future calculations will utilize the molecular weight of 100 specified in your letter.*

Comment 5, Section 1.0, Page 1-1, third paragraph: The removal rate calculation is based on an air flow rate of 2,250 scfm. The expanded SVE system is expected to have 28 to 33 wells. Thus, the air flow rate per well will be 68 to 80 scfm, which is significantly higher than the air flow rates of 35 to 50 used in the test. Please explain how many additional wells will be installed under the expanded SVE system and how these higher flow rates and capacity will be achieved.

Response: *The 3 existing blower/thermal oxidizer units are capable of a total capacity of 2,250 scfm at 150 inches of WC vacuum. An additional blower/oxidizer unit is on order and will be installed in July 2005 to provide additional vapor flow rates from the wells around the Community Center (two of which are connected to the temporary treatment unit) and from the shallow wells installed next to the existing HSVE wells.*

The SVE pilot test conducted at HSVE-1D indicated that optimum vacuum influence was achieved at between 75 and 100 scfm. The SVE pilot test conducted in North Olive formation at the Community Center (HSVE-20S) indicated that optimum vacuum influence was achieved at between 35 to 50 scfm. The expanded system will have a total of 43 wells (22 deep and 21 shallow). Currently, both the shallow and deep wells are within the flow rate expected based on the pilot testing. Therefore, with all wells operating within the optimum ranges, a total flow capacity needed will be between 2,400 and 3,250 scfm. With the 4th unit, the total system capacity will be 3,000 scfm at 150 inches of WC vacuum.

Comment 6, Section 1.0, Page 1-1, third paragraph: It is stated that SVE has been successful at the site. SVE has been tested at five site wells and appears have only limited successfulness. SVE appears to be very successful at TPH removal in one well (initial removal rate of 53 to 74 gallons per day at HMW-46A), moderately successful in one well (initial removal rate of 9.5 gallons per day at HSE-20), and unsuccessful in three wells (initial removal rate of less than 1 gallon per day at RW-3, RW-4A, and RW-5). Thus, it appears that the likelihood of success of SVE in TPH removal at the site is highly variable and dependent on hydrogeology. The agencies believe that the expanded SVE

system will decrease and minimize the vapor intrusion problem documented in homes in North Hartford, Illinois. The other two remediation efforts, 1) interim measures, specifically the sealing of basement homes and ventilation systems and; 2) product collection, are essential to eliminating potential health exposures to residents of North Hartford.

Response: *The SVE results referred to in the Agency's comments were from a pilot test conducted at the Community Center focused on extraction from the North Olive stratum only. This test was conducted to determine if a well placed only in this uppermost permeable layer could be effective in developing vacuum influence throughout North Hartford in an effort to decrease and eliminate vapor intrusion. The SVE pilot test results conducted on HSVE-1D (a deep well) showed the concentrations of TPH previously used for mass removal estimates. These wells are anticipated to assist in the vapor mitigation efforts, and to also provide mass removal of residual LNAPL and mobile LNAPL on the groundwater surface within the Main Sand.*

As stated before, SVE has been implemented first due to its ability to assist with vapor intrusion mitigation. However, as stated in previous response comments above, HWG is currently conducting HVR pilot testing across the site to evaluate liquid phase LNAPL removal to augment SVE where appropriate.

Comment 7, Section 1.0, Page 1-1, third paragraph: The data from the SVE pilot test report indicates that SVE was ineffective at reducing the product thickness in the test area. Based on available LNAPL thickness data (Figures 2-5 and 2-6) there was no LNAPL detected in any of the nearby monitoring wells during the January 2005 event.

Well	LNAPL Thickness before SVE test (January 17-21, 2005)	LNAPL Thickness After SVE Test (February 23-24, 2005)	Distance from SVE Test Well, HMW-46C	Distance from SVE Test Well, HSVE-20
HMW-46C	0.00 feet	0.25 feet	12 feet	120 feet
HMW-47C	0.00 feet	0.02 feet	185 feet	84 feet
HMW-45C	0.00 feet	2.34 feet	235 feet	168 feet

However, after SVE testing at HMW-46A and HSVE-20, LNAPL was detected in all three of the wells. This appearance of LNAPL after the test may be due to other factors (such as a rising or falling water table), but it certainly does not demonstrate that SVE is effective at reducing LNAPL thickness. Please provide evidence regarding the success of SVE at this or other sites in reducing product thickness. In lieu of actual site evidence, SVE modeling should be conducted to provide more realistic estimates of cleanup time. Furthermore, a full area wide characterization of the refined product is necessary to determine the effectiveness of SVE.

Response: *Again, the information referred to is related to the SVE pilot test conducted at the Community Center in the North Olive stratum located above the Main Sand. As the SVE system continues operation, LNAPL thickness will be monitored monthly. SVE is expected to have more significant effect on residual phase rather than product thickness. Vacuum based remediation technologies commonly liberate residual NAPL from vadose zone soils by reducing the capillary pressures affecting both NAPL and water. At reduced pressures, such fluids can be induced to flow into wells. H_2A Environmental, Ltd. is the company currently performing HVR testing at the site. It is not uncommon in H_2A's experience to observe LNAPL accumulations in wells as a result of the application of vacuum to the subsurface. As a site-specific example from the recent HVR pilot testing, HVR was applied to well MP47C utilizing a down hole stinger placement at an immersion depth of approximately 25% of the apparent LNAPL thickness in the well. After approximately 8 hours of HVR, the LNAPL apparent thickness present in the well increased by more than 50%.*

Comment 8, Section 1.0, Page 1-1, third paragraph: It is stated that the skimmer pumps in RW-2 and RW-4 have recovered a little over 1,100 gallons of LNAPL in the past 5 months. This statement neglects the 1,991 gallons of LNAPL recovered in 1.5 months in early 2004 from RW-2. Additionally, recent LNAPL measurements at RW-2 indicate continued high apparent LNAPL thickness observed in RW-2 (3.14 feet in January 2005 and 1.49 feet in February 2005). Thus, past LNAPL recovery efforts at RW-2 have been productive and additional skimming is likely to continue producing significant quantities of product.

As stated before, the MPE testing at RW-4A, RW-3, and RW-5 (which is a combination of pumping and SVE) using air flow rates similar to those used in the SVE test (5 to 40 scfm) removed less than 1 gallon per day, all in the vapor phase, compared to an average of 3 gallons per day recovered using a combination of skimming and vacuuming. This demonstrates that SVE is not more effective than skimming for product removal at several locations. Please explain this discrepancy.

Response: *As stated previously, the HWG has continued skimming at the above-mentioned locations since liquid LNAPL is still being removed. The previous MPE tests were not conclusive due to vapor abatement equipment limitations. Current HVR pilot testing at 10 wells throughout the affected area in the Village have demonstrated vapor phase VOC extraction rates from 0.2-2.1 gal/hr (equivalent to 4.8-50.4 gallons per day of vapor phase removal). The average value for vapor phase VOC removal from these pilot test wells is close to 40 gallons per day, thereby demonstrating that vapor phase removal from the site is typically significantly greater than skimming rates of removal achieved on average.*

The HVR pilot testing currently being conducted is also evaluating where mobile LNAPL can be removed through liquid removal to enhance the total mass of LNAPL removed from the site. The effectiveness of skimming will be evaluated relative to other technologies (SVE, HVR) following completion of the LNAPL characterization and modeling.

Comment 9, Section 1.0, Page 1-2, second paragraph: It is stated that high vacuum recovery (MPE) will be evaluated at certain areas and, if successful, skimmer pumps may deployed. Skimmer pumps often have recovery rates up to 10 times lower than MPE. It is not clear why, if MPE is successful, it would be replaced with a less aggressive technology. If skimming pumps are installed they should be utilized in tandem with a ground water depression pump. The agencies again request that the HWG install and test a dual phase recovery system which depresses the ground water table and collects and pumps the recovered product. The land owned by Premcor at Birch Street would be an ideal location for this pilot test. A recovery well should be installed and screened in the appropriate geologic strata to maximize drawdown of the ground water table and the product skimming pump should be installed in the same well or wells that are in close proximity. A pump down test should be conducted using different flow rates and depths of LNAPL recorded in monitoring wells in close proximity. All water will have to managed and treated prior to discharge.

Response: *The installation of the skimmer pumps was being proposed as an interim measure for LNAPL removal in areas deemed appropriate during the pilot testing of HVR. As indicated previously, LNAPL removal in North Hartford will likely employ various technologies to achieve the desired removal of the mobile LNAPL. The results of the HVR testing were proposed to be used to identify these areas where interim LNAPL removal could be conducted while the final remedy was selected and designed.*

In response to the request to conduct a dual-phase pilot test, the HWG proposes to approach the appropriateness of this testing through further data gathering and predictive modeling. This will include collection of soil core samples in various areas

throughout the LNAPL plume to provide representative information on LNAPL saturation and other necessary parameters in different geologic units in North Hartford. This information, along with additional LNAPL sample analyses, will be used to conduct predictive modeling for various LNAPL removal technologies. The model to be used is an API model developed by Charbeneau et al., (1999).

Pilot testing of High Vacuum Remediation technologies in various modes including slurping, two-phase extraction, dual-phase extraction, vacuum enhanced skimming, and vacuum enhanced pumping can be implemented as part of the HVR pilot testing currently underway in the Village of Hartford.

Comment 10, Page 3-1, Section 3.1.1: It is stated that LNAPL does not easily recharge in the wells once removed in most of the areas within the village. The basis for this statement is not clear when compared to the bail down test results on Figure 2-1, which indicate near immediate recovery in 3 of 7 wells tested, and slower, and substantial recovery was noted in the remaining 4 wells tested. The success rate of the bail down testing appears to be higher than the success rate of the SVE testing. It would be more correct to state that the LNAPL recharge rate varies based on the permeability and apparent LNAPL thickness of free product. The slower recovery rates at certain wells merely demonstrate that LNAPL recovery efforts are likely to be more productive in areas with higher permeability soils and further characterization and modeling should be conducted to identify these areas. In addition, the bail down tests do not reflect the amount of product which can be collected if ground water tables are depressed in those areas of high productivity.

Response: *Additional bail-down testing and recharge data analysis is planned for the affected site in conjunction with the ongoing HVR testing. As part of the HVR testing, recharge data for LNAPL into the wells upon completion of the HVR event at each well is being collected and will be analyzed to determine typical recharge rates across the site.*

Comment 11, Page 3-3, Section 3.1.3: The Dual Phase Test at the Premcor facility is poor demonstration of this technology for number of reasons. The well which was utilized for this test is an old production well that is screened too deep to have a substantial effect on the LNAPL layer beneath the refinery. In addition, the production well is not screened in the all of the geologic strata that will be required to remove the LNAPL in the Village of North Hartford.

A minimum of four technologies should be evaluated at similar locations. Skimming, dual phase collection, Vacuum Enhanced Recovery, and Multi Phase Extraction should be conducted at RMW-38A or at an alternate location agreed to by HWG and the Agencies to determine the comparative effectiveness of these four technologies at a similar location. This would generate the best results to compare these technologies in North Hartford.

Response: *As stated above, the HWG will be collecting additional site-specific data in order to understand the nature of the mobile LNAPL and conduct predictive LNAPL recovery modeling for various technologies. Based on this information, additional pilot testing may be proposed to evaluate technologies either not previously tested or currently being tested.*

Current pilot testing from 10 wells across the affected area in the Village of Hartford have indicated that the area around HMW-44C is most suitable for a long-term pilot test to determine the optimum configuration and achievable production rates from the site in various High Vacuum Remediation configurations. The current pilot test will conduct 5 rotation cycles (each cycle takes two weeks to conduct one-day recovery tests at each location). Long-term pilot testing may be warranted following the results of the current HVR testing.

Comment 12, Page 3-4, Section 3.1.4: The agencies believe the recovery rate to be over stated as discussed in Comment 3.

Response: *Please see previous response.*

General Comments:

General Comment 1: The report does not discuss the potential applicability of commonly successful LNAPL recovery technologies such as Vacuum Enhanced Recovery (VER) (conducting LNAPL skimming in a well in conjunction with SVE). VER has a proven track record of increasing skimming rates by a factor of 2 to 5 (Heffron 2003). Please evaluate VER as a potential recovery method to the remedy selection.

Response: *The HVR pilot tests will be conducted in a vacuum enhanced skimming mode analogous to VER, as described to evaluate its potential effectiveness and application to this site.*

General Comment 2: Evaluation of remedial technology effectiveness is difficult when tests of various technologies are conducted at different wells. For example, the dual phase test is on the Premcor site, SVE was tested at the Community Center, MPE was tested in RW-4A and RW-5, and skimming was conducted in RW-2 and RW-4A. This makes direct comparison of the technologies difficult. Future technology evaluations should be conducted in the same areas, if not the same wells, to minimize these hydrogeological differences and provide a more direct comparison.

Response: *The current HVR pilot testing and LNAPL sampling/modeling will be used to determine the need and/or a location for additional pilot testing.*

General Comment 3: Similar large LNAPL sites, such as the Burlington Northern Diesel Site in Mandan, North Dakota, the Defense Support Center Philadelphia (DSCP) site in Philadelphia, Pennsylvania, Naval Air Station Lemoore, Lemoore, California, and others have required employment of a number of LNAPL recovery technologies with extraction points spaced throughout the entire LNAPL plume, anywhere from every 20 to 50 feet. It seems likely that successful recovery of LNAPL at the Hartford Area Hydrocarbon Plume Site will entail a similar level of effort.

Response: *The proposed HVR pilot testing, in conjunction with additional data gathering/predictive modeling, previously performed SVE and other pilot testing, will be analyzed to identify the optimum technology, or group of technologies, that will most efficiently and effectively remediate the site.*

General Comment 4: The agencies have noted that high-permeability bedding in the utility and pipeline corridors has, in places, provided a preferential pathway for LNAPL migration and vapor migration. Future placement of recovery wells and SVE wells should incorporate these higher permeability corridors.

Response: *As part of the ongoing SVE system monitoring, residential effectiveness monitoring, and further development of the Conceptual Site Model, these potential migration pathways will be identified and addressed as part of the Active Recovery remedy.*

General Comment 5: The SVE Pilot test report states that the effective ROI is 200 to 300 feet. The basis for this ROI estimate is a vacuum response greater than 0.1 inches water column. The 0.1-inch water column vacuum response can be used to determine the vacuum ROI to measure the area in which there is a vacuum influence, but provides little information regarding the air exchange rate necessary to remove TPH-contaminated soil vapors. Thus, while the SVE well may induce a vacuum at distances of 200 to 300 feet and provide vapor control in these areas, the air flow rate at these distances is likely to be so low that TPH removal rates are extremely slow. Although the SVE Pilot test report states that the SVE testing was conducted in accordance with the Army Corps of Engineers guidance (USACE 2002), this manual explicitly states that pore gas velocity should be the basis for design, not vacuum ROI. The HWG should measure and calculate the pore gas velocity in any pilot or operational conditions in the future.

Response: *Additional information on pore gas velocity will be collected as part of the SVE system monitoring so that effectiveness influence of the SVE system can be determined.*

General Comment 6: The MPE testing conducted at the site appears to have been conducted in an area with little free-phase LNAPL during the time of the test and in a manner which caused groundwater mounding at the extraction well (performed properly, MPE should create a drawdown at the extraction well). Thus, it appears that the location of the test and the manner in which it was conducted may lead to the potentially incorrect conclusion that MPE is not viable at the site. The upcoming MPE testing by H2A should be conducted at a number of wells with rapidly recoverable LNAPL (such as MP-29D, MP-47C, HWM-44C), and using wells with slower recharging LNAPL (such as MP-53C, MP-39C and MP-45C) to determine if there is an increase in LNAPL recovery rates over skimming. MPE should also be tested at HMW-46C so that its effectiveness can be compared to SVE conducted at HMW-46A.

Response: *H_2A's HVR pilot testing is being performed at 10 wells across the site covering a range of LNAPL apparent thicknesses and recharge rates. Consequently, this*

pilot testing should provide an evaluation of the range of potential recovery rates across the site.

A technical memorandum providing details of the additional LNAPL characterization work being conducted will be submitted to the Agencies by July 18, 2005.

Sincerely,

Jeffery L. Pope, P.E.
Vice President
Director of Remediation Engineering

Enclosures: Laboratory Report from the SVE Pilot Test
April 21, 2005 Laboratory Report
May 11, 2005 Laboratory Report

cc: Hartford Working Group
Chris Cahnovsky (IEPA, Collinsville – 2 copies)
Jim Moore (IEPA, Springfield – 3 copies)
Dave Webb (Illinois DPH – 1 copy)
Robert Egan (USEPA, Region 5 – 1 copy)
Tom Binz (TT EMI / USEPA – 4 copies)
Robert Howe (TT EMI / USEPA – 1 copy)
Dave Beretska (TT EMI / USEPA – 1 copy)

APPENDIX D

LABORATORY REPORTS

AIR TOXICS LTD.

SAMPLE NAME: 020105 HCC PSHMW46A-IF46

ID#: 0502057B-21A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	b022010	Date of Collection:	2/1/05
Dil. Factor:	186000	Date of Analysis:	2/20/05 06:50 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Benzene	93000	330000	300000	1000000
Ethyl Benzene	93000	Not Detected	400000	Not Detected
Styrene	93000	Not Detected	400000	Not Detected
Toluene	93000	Not Detected	350000	Not Detected
1,2,4-Trimethylbenzene	93000	Not Detected	460000	Not Detected
1,3,5-Trimethylbenzene	93000	Not Detected	460000	Not Detected
m,p-Xylene	93000	Not Detected	400000	Not Detected
o-Xylene	93000	Not Detected	400000	Not Detected
Cyclohexane	370000	Not Detected	1300000	Not Detected
Cyclopentane	370000	480000	1100000	1400000
2,2-Dimethylbutane	370000	Not Detected	1300000	Not Detected
2,3-Dimethylbutane	370000	1100000	1300000	3800000
2,3-Dimethylpentane	370000	780000	1500000	3200000
2,4-Dimethylpentane	370000	510000	1500000	2100000
Heptane	370000	Not Detected	1500000	Not Detected
Hexane	370000	1700000	1300000	6000000
Isoprene	370000	Not Detected	1000000	Not Detected
Cumene	370000	Not Detected	1800000	Not Detected
Isopentane	370000	26000000	1100000	76000000
Methylcyclohexane	370000	Not Detected	1500000	Not Detected
Methylcyclopentane	370000	1000000	1300000	3500000
2-Methylheptane	370000	Not Detected	1700000	Not Detected
3-Methylheptane	370000	Not Detected	1700000	Not Detected
2-Methylhexane	370000	480000	1500000	2000000
3-Methylhexane	370000	550000	1500000	2300000
2-Methylpentane	370000	4200000	1300000	15000000
3-Methylpentane	370000	2200000	1300000	7900000
Nonane	370000	Not Detected	2000000	Not Detected
Octane	370000	Not Detected	1700000	Not Detected
Pentane	370000	10000000	1100000	29000000
1-Pentene	370000	Not Detected	1100000	Not Detected
cis-2-Pentene	370000	Not Detected	1100000	Not Detected
trans-2-Pentene	370000	Not Detected	1100000	Not Detected
Propylbenzene	370000	Not Detected	1800000	Not Detected
2,2,4-Trimethylpentane	370000	600000	1700000	2800000
2,3,4-Trimethylpentane	370000	Not Detected	1700000	Not Detected
1-Hexene	370000	Not Detected	1300000	Not Detected
3-Ethyltoluene	370000	Not Detected	1800000	Not Detected
4-Ethyltoluene	370000	Not Detected	1800000	Not Detected
2-Ethyltoluene	370000	Not Detected	1800000	Not Detected
Decane	370000	Not Detected	2200000	Not Detected
1,2,3-Trimethylbenzene	370000	Not Detected	1800000	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 020105 HCC PSHMW46A-IF46

ID#: 0502057B-21A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**b022010**	**Date of Collection:**	**2/1/05**
Dil. Factor:	**186000**	**Date of Analysis:**	**2/20/05 06:50 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
1,3-Diethylbenzene	370000	Not Detected	2000000	Not Detected
1,4-Diethylbenzene	370000	Not Detected	2000000	Not Detected
Undecane	370000	Not Detected	2400000	Not Detected
cis-2-Hexene	930000	Not Detected	3200000	Not Detected
trans-2-Hexene	930000	Not Detected	3200000	Not Detected
alpha-Pinene	930000	Not Detected	5200000	Not Detected
beta-Pinene	930000	Not Detected	5200000	Not Detected
Cyclopentene	370000	Not Detected	1000000	Not Detected
1-Undecene	930000	Not Detected	5800000	Not Detected
1-Decene	930000	Not Detected	5300000	Not Detected
1-Nonene	370000	Not Detected	1900000	Not Detected
1-Octene	370000	Not Detected	1700000	Not Detected
1-Heptene	370000	Not Detected	1500000	Not Detected
1,3-Butadiene	93000	Not Detected	200000	Not Detected
TPH ref. to Gasoline (MW=100)	1900000	43000000	7600000	180000000

TENTATIVELY IDENTIFIED COMPOUNDS

Compound	CAS Number	Match Quality	Amount ppbv
Dodecane	112-40-3	NA	Not Detected
1-Dodecene	112-41-4	NA	Not Detected
Tridecane	629-50-5	NA	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	98	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	116	70-130

AIR TOXICS LTD.

SAMPLE NAME: 020105 HCC PSHMW46A-EF46

ID#: 0502057B-22A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**b022014**	**Date of Collection: 2/1/05**	
Dil. Factor:	**6700**	**Date of Analysis: 2/20/05 10:38 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Benzene	3400	12000	11000	38000
Ethyl Benzene	3400	Not Detected	14000	Not Detected
Styrene	3400	Not Detected	14000	Not Detected
Toluene	3400	Not Detected	13000	Not Detected
1,2,4-Trimethylbenzene	3400	Not Detected	16000	Not Detected
1,3,5-Trimethylbenzene	3400	Not Detected	16000	Not Detected
m,p-Xylene	3400	Not Detected	14000	Not Detected
o-Xylene	3400	Not Detected	14000	Not Detected
Cyclohexane	13000	Not Detected	46000	Not Detected
Cyclopentane	13000	14000	38000	40000
2,2-Dimethylbutane	13000	Not Detected	47000	Not Detected
2,3-Dimethylbutane	13000	33000	47000	120000
2,3-Dimethylpentane	13000	23000	55000	94000
2,4-Dimethylpentane	13000	15000	55000	62000
Heptane	13000	Not Detected	55000	Not Detected
Hexane	13000	52000	47000	180000
Isoprene	13000	Not Detected	37000	Not Detected
Cumene	13000	Not Detected	66000	Not Detected
Isopentane	13000	780000	40000	2300000
Methylcyclohexane	13000	Not Detected	54000	Not Detected
Methylcyclopentane	13000	30000	46000	100000
2-Methylheptane	13000	Not Detected	63000	Not Detected
3-Methylheptane	13000	Not Detected	62000	Not Detected
2-Methylhexane	13000	17000	55000	70000
3-Methylhexane	13000	16000	55000	68000
2-Methylpentane	13000	130000	47000	450000
3-Methylpentane	13000	68000	47000	240000
Nonane	13000	Not Detected	70000	Not Detected
Octane	13000	Not Detected	62000	Not Detected
Pentane	13000	300000	40000	900000
1-Pentene	13000	Not Detected	38000	Not Detected
cis-2-Pentene	13000	Not Detected	38000	Not Detected
trans-2-Pentene	13000	Not Detected	38000	Not Detected
Propylbenzene	13000	Not Detected	66000	Not Detected
2,2,4-Trimethylpentane	13000	18000	62000	86000
2,3,4-Trimethylpentane	13000	Not Detected	63000	Not Detected
1-Hexene	13000	Not Detected	46000	Not Detected
3-Ethyltoluene	13000	Not Detected	66000	Not Detected
4-Ethyltoluene	13000	Not Detected	66000	Not Detected
2-Ethyltoluene	13000	Not Detected	66000	Not Detected
Decane	13000	Not Detected	78000	Not Detected
1,2,3-Trimethylbenzene	13000	Not Detected	66000	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 020105 HCC PSHMW46A-EF46

ID#: 0502057B-22A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**b022014**	**Date of Collection: 2/1/05**	
Dil. Factor:	**6700**	**Date of Analysis: 2/20/05 10:38 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
1,3-Diethylbenzene	13000	Not Detected	73000	Not Detected
1,4-Diethylbenzene	13000	Not Detected	74000	Not Detected
Undecane	13000	Not Detected	86000	Not Detected
cis-2-Hexene	34000	Not Detected	120000	Not Detected
trans-2-Hexene	34000	Not Detected	120000	Not Detected
alpha-Pinene	34000	Not Detected	190000	Not Detected
beta-Pinene	34000	Not Detected	190000	Not Detected
Cyclopentene	13000	Not Detected	37000	Not Detected
1-Undecene	34000	Not Detected	210000	Not Detected
1-Decene	34000	Not Detected	190000	Not Detected
1-Nonene	13000	Not Detected	69000	Not Detected
1-Octene	13000	Not Detected	62000	Not Detected
1-Heptene	13000	Not Detected	54000	Not Detected
1,3-Butadiene	3400	Not Detected	7400	Not Detected
TPH ref. to Gasoline (MW=100)	67000	1200000	270000	4900000

TENTATIVELY IDENTIFIED COMPOUNDS

Compound	CAS Number	Match Quality	Amount ppbv
Dodecane	112-40-3	NA	Not Detected
1-Dodecene	112-41-4	NA	Not Detected
Tridecane	629-50-5	NA	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	100	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	113	70-130

AIR TOXICS LTD.

SAMPLE NAME: 020105 HCC PSHMW46A-IF73

ID#: 0502057B-23A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	b022013	Date of Collection:	2/1/05
Dil. Factor:	219000	Date of Analysis:	2/20/05 09:49 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Benzene	110000	410000	350000	1300000
Ethyl Benzene	110000	Not Detected	480000	Not Detected
Styrene	110000	Not Detected	470000	Not Detected
Toluene	110000	Not Detected	410000	Not Detected
1,2,4-Trimethylbenzene	110000	Not Detected	540000	Not Detected
1,3,5-Trimethylbenzene	110000	Not Detected	540000	Not Detected
m,p-Xylene	110000	Not Detected	480000	Not Detected
o-Xylene	110000	Not Detected	480000	Not Detected
Cyclohexane	440000	Not Detected	1500000	Not Detected
Cyclopentane	440000	570000	1200000	1600000
2,2-Dimethylbutane	440000	Not Detected	1500000	Not Detected
2,3-Dimethylbutane	440000	1300000	1500000	4700000
2,3-Dimethylpentane	440000	900000	1800000	3700000
2,4-Dimethylpentane	440000	640000	1800000	2600000
Heptane	440000	Not Detected	1800000	Not Detected
Hexane	440000	2000000	1500000	7200000
Isoprene	440000	Not Detected	1200000	Not Detected
Cumene	440000	Not Detected	2200000	Not Detected
Isopentane	440000	31000000	1300000	92000000
Methylcyclohexane	440000	Not Detected	1800000	Not Detected
Methylcyclopentane	440000	1200000	1500000	4100000
2-Methylheptane	440000	Not Detected	2000000	Not Detected
3-Methylheptane	440000	Not Detected	2000000	Not Detected
2-Methylhexane	440000	620000	1800000	2500000
3-Methylhexane	440000	660000	1800000	2700000
2-Methylpentane	440000	4900000	1500000	17000000
3-Methylpentane	440000	2700000	1500000	9600000
Nonane	440000	Not Detected	2300000	Not Detected
Octane	440000	Not Detected	2000000	Not Detected
Pentane	440000	12000000	1300000	35000000
1-Pentene	440000	Not Detected	1200000	Not Detected
cis-2-Pentene	440000	Not Detected	1200000	Not Detected
trans-2-Pentene	440000	Not Detected	1200000	Not Detected
Propylbenzene	440000	Not Detected	2200000	Not Detected
2,2,4-Trimethylpentane	440000	730000	2000000	3400000
2,3,4-Trimethylpentane	440000	Not Detected	2000000	Not Detected
1-Hexene	440000	Not Detected	1500000	Not Detected
3-Ethyltoluene	440000	Not Detected	2200000	Not Detected
4-Ethyltoluene	440000	Not Detected	2200000	Not Detected
2-Ethyltoluene	440000	Not Detected	2200000	Not Detected
Decane	440000	Not Detected	2500000	Not Detected
1,2,3-Trimethylbenzene	440000	Not Detected	2200000	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 020105 HCC PSHMW46A-IF73

ID#: 0502057B-23A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	b022013	Date of Collection:	2/1/05
Dil. Factor:	219000	Date of Analysis:	2/20/05 09:49 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
1,3-Diethylbenzene	440000	Not Detected	2400000	Not Detected
1,4-Diethylbenzene	440000	Not Detected	2400000	Not Detected
Undecane	440000	Not Detected	2800000	Not Detected
cis-2-Hexene	1100000	Not Detected	3800000	Not Detected
trans-2-Hexene	1100000	Not Detected	3800000	Not Detected
alpha-Pinene	1100000	Not Detected	6100000	Not Detected
beta-Pinene	1100000	Not Detected	6100000	Not Detected
Cyclopentene	440000	Not Detected	1200000	Not Detected
1-Undecene	1100000	Not Detected	6900000	Not Detected
1-Decene	1100000	Not Detected	6300000	Not Detected
1-Nonene	440000	Not Detected	2300000	Not Detected
1-Octene	440000	Not Detected	2000000	Not Detected
1-Heptene	440000	Not Detected	1800000	Not Detected
1,3-Butadiene	110000	Not Detected	240000	Not Detected
TPH ref. to Gasoline (MW=100)	2200000	49000000	9000000	200000000

TENTATIVELY IDENTIFIED COMPOUNDS

Compound	CAS Number	Match Quality	Amount ppbv
Dodecane	112-40-3	NA	Not Detected
1-Dodecene	112-41-4	NA	Not Detected
Tridecane	629-50-5	NA	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	99	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	115	70-130

AIR TOXICS LTD.

SAMPLE NAME: 020105 HCC PSHMW46A-EF73

ID#: 0502057B-24A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**b022207**	**Date of Collection:**	**2/1/05**
Dil. Factor:	**9730**	**Date of Analysis:**	**2/22/05 10:51 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Benzene	4900	20000	16000	64000
Ethyl Benzene	4900	Not Detected	21000	Not Detected
Styrene	4900	Not Detected	21000	Not Detected
Toluene	4900	Not Detected	18000	Not Detected
1,2,4-Trimethylbenzene	4900	Not Detected	24000	Not Detected
1,3,5-Trimethylbenzene	4900	Not Detected	24000	Not Detected
m,p-Xylene	4900	Not Detected	21000	Not Detected
o-Xylene	4900	Not Detected	21000	Not Detected
Cyclohexane	19000	Not Detected	67000	Not Detected
Cyclopentane	19000	28000	56000	82000
2,2-Dimethylbutane	19000	Not Detected	68000	Not Detected
2,3-Dimethylbutane	19000	73000	68000	260000
2,3-Dimethylpentane	19000	58000	80000	240000
2,4-Dimethylpentane	19000	38000	80000	150000
Heptane	19000	Not Detected	80000	Not Detected
Hexane	19000	100000	68000	360000
Isoprene	19000	Not Detected	54000	Not Detected
Cumene	19000	Not Detected	96000	Not Detected
Isopentane	19000	1400000	57000	4100000
Methylcyclohexane	19000	Not Detected	78000	Not Detected
Methylcyclopentane	19000	69000	67000	240000
2-Methylheptane	19000	Not Detected	91000	Not Detected
3-Methylheptane	19000	Not Detected	91000	Not Detected
2-Methylhexane	19000	33000	80000	140000
3-Methylhexane	19000	37000	80000	150000
2-Methylpentane	19000	250000	68000	890000
3-Methylpentane	19000	150000	68000	530000
Nonane	19000	Not Detected	100000	Not Detected
Octane	19000	Not Detected	91000	Not Detected
Pentane	19000	530000	57000	1600000
1-Pentene	19000	Not Detected	56000	Not Detected
cis-2-Pentene	19000	Not Detected	56000	Not Detected
trans-2-Pentene	19000	Not Detected	56000	Not Detected
Propylbenzene	19000	Not Detected	96000	Not Detected
2,2,4-Trimethylpentane	19000	48000	91000	220000
2,3,4-Trimethylpentane	19000	Not Detected	91000	Not Detected
1-Hexene	19000	Not Detected	67000	Not Detected
3-Ethyltoluene	19000	Not Detected	96000	Not Detected
4-Ethyltoluene	19000	Not Detected	96000	Not Detected
2-Ethyltoluene	19000	Not Detected	96000	Not Detected
Decane	19000	Not Detected	110000	Not Detected
1,2,3-Trimethylbenzene	19000	Not Detected	96000	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 020105 HCC PSHMW46A-EF73

ID#: 0502057B-24A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**b022207**	**Date of Collection: 2/1/05**	
Dil. Factor:	**9730**	**Date of Analysis: 2/22/05 10:51 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
1,3-Diethylbenzene	19000	Not Detected	110000	Not Detected
1,4-Diethylbenzene	19000	Not Detected	110000	Not Detected
Undecane	19000	Not Detected	120000	Not Detected
cis-2-Hexene	49000	Not Detected	170000	Not Detected
trans-2-Hexene	49000	Not Detected	170000	Not Detected
alpha-Pinene	49000	Not Detected	270000	Not Detected
beta-Pinene	49000	Not Detected	270000	Not Detected
Cyclopentene	19000	Not Detected	54000	Not Detected
1-Undecene	49000	Not Detected	310000	Not Detected
1-Decene	49000	Not Detected	280000	Not Detected
1-Nonene	19000	Not Detected	100000	Not Detected
1-Octene	19000	Not Detected	89000	Not Detected
1-Heptene	19000	Not Detected	78000	Not Detected
1,3-Butadiene	4900	Not Detected	11000	Not Detected
TPH ref. to Gasoline (MW=100)	97000	2400000	400000	9800000

TENTATIVELY IDENTIFIED COMPOUNDS

Compound	CAS Number	Match Quality	Amount ppbv
Dodecane	112-40-3	NA	Not Detected
1-Dodecene	112-41-4	NA	Not Detected
Tridecane	629-50-5	NA	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	94	70-130
Toluene-d8	95	70-130
4-Bromofluorobenzene	111	70-130

AIR TOXICS LTD.

SAMPLE NAME: 020105 HCC PSHMW46A-IF46

ID#: 0502057D-21A

MODIFIED TO-14A

File Name:	**e021006b**	**Date of Collection: 2/1/05**	
Dil. Factor:	**1750**	**Date of Analysis: 2/10/05 02:13 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Isobutane	3500	4400000	8300	10000000
Butane	8800	16000000	21000	38000000
trans-2-butene	3500	62000	8000	140000
1-Butene	3500	Not Detected	8000	Not Detected
cis-2-Butene	3500	20000	8000	46000
Acetylene	8800	Not Detected	9300	Not Detected
Ethene	8800	Not Detected	10000	Not Detected
Propane	8800	100000	16000	180000
Ethane	8800	140000	11000	170000
Propylene	8800	Not Detected	15000	Not Detected

Container Type: 6 Liter Summa Canister

AIR TOXICS LTD.

SAMPLE NAME: 020105 HCC PSHMW46A-EF46

ID#: 0502057D-22A

MODIFIED TO-14A

File Name:	**e021007b**	**Date of Collection: 2/1/05**	
Dil. Factor:	**44.7**	**Date of Analysis: 2/10/05 02:42 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Isobutane	89	140000	210	320000
Butane	220	500000	530	1200000
trans-2-butene	89	1900	200	4400
1-Butene	89	Not Detected	200	Not Detected
cis-2-Butene	89	620	200	1400
Acetylene	220	Not Detected	240	Not Detected
Ethene	220	Not Detected	260	Not Detected
Propane	220	3000	400	5400
Ethane	220	4000	270	4800
Propylene	220	Not Detected	380	Not Detected

Container Type: 6 Liter Summa Canister

AIR TOXICS LTD.

SAMPLE NAME: 020105 HCC PSHMW46A-IF73

ID#: 0502057D-23A

MODIFIED TO-14A

File Name:	**e021008b**	**Date of Collection: 2/1/05**	
Dil. Factor:	**1670**	**Date of Analysis: 2/10/05 03:09 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Isobutane	3300	4200000	7900	10000000
Butane	8400	16000000	20000	38000000
trans-2-butene	3300	64000	7700	150000
1-Butene	3300	Not Detected	7700	Not Detected
cis-2-Butene	3300	21000	7700	48000
Acetylene	8400	Not Detected	8900	Not Detected
Ethene	8400	Not Detected	9600	Not Detected
Propane	8400	100000	15000	180000
Ethane	8400	130000	10000	160000
Propylene	8400	Not Detected	14000	Not Detected

Container Type: 6 Liter Summa Canister

AIR TOXICS LTD.

SAMPLE NAME: 020105 HCC PSHMW46A-EF73

ID#: 0502057D-24A

MODIFIED TO-14A

File Name:	**e021009b**	**Date of Collection: 2/1/05**	
Dil. Factor:	**58.4**	**Date of Analysis: 2/10/05 03:36 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Isobutane	120	170000	280	400000
Butane	290	640000	690	1500000
trans-2-butene	120	2600	270	5900
1-Butene	120	Not Detected	270	Not Detected
cis-2-Butene	120	840	270	1900
Acetylene	290	Not Detected	310	Not Detected
Ethene	290	Not Detected	330	Not Detected
Propane	290	3900	530	7100
Ethane	290	4800	360	6000
Propylene	290	Not Detected	500	Not Detected

Container Type: 6 Liter Summa Canister

AIR TOXICS LTD.

SAMPLE NAME: 020105 HCC PSHMW46A-IF46

ID#: 0502057F-21A

MODIFIED NATURAL GAS ANALYSIS BY ASTM D-1946

File Name:	**9020721**	**Date of Collection:**	**2/1/05**
Dil. Factor:	**1.49**	**Date of Analysis:**	**2/7/05 12:32 PM**

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.15	0.36
Methane	0.00015	73
Carbon Dioxide	0.015	16

Container Type: 6 Liter Summa Canister

AIR TOXICS LTD.

SAMPLE NAME: 020105 HCC PSHMW46A-EF46

ID#: 0502057F-22A

MODIFIED NATURAL GAS ANALYSIS BY ASTM D-1946

File Name:	**9020722**	**Date of Collection: 2/1/05**	
Dil. Factor:	**1.34**	**Date of Analysis: 2/7/05 12:53 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.13	21
Methane	0.00013	1.9
Carbon Dioxide	0.013	0.45

Container Type: 6 Liter Summa Canister

AIR TOXICS LTD.

SAMPLE NAME: 020105 HCC PSHMW46A-IF73

ID#: 0502057F-23A

MODIFIED NATURAL GAS ANALYSIS BY ASTM D-1946

File Name:	**9020723**	**Date of Collection: 2/1/05**	
Dil. Factor:	**1.75**	**Date of Analysis: 2/7/05 01:14 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.18	0.83
Methane	0.00018	67
Carbon Dioxide	0.018	15

Container Type: 6 Liter Summa Canister

AIR TOXICS LTD.

SAMPLE NAME: 020105 HCC PSHMW46A-EF73

ID#: 0502057F-24A

MODIFIED NATURAL GAS ANALYSIS BY ASTM D-1946

File Name:	**9020724**	**Date of Collection: 2/1/05**	
Dil. Factor:	**1.46**	**Date of Analysis: 2/7/05 01:43 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.15	20
Methane	0.00015	2.4
Carbon Dioxide	0.015	0.58

Container Type: 6 Liter Summa Canister

AIR TOXICS LTD.

SAMPLE NAME: 020305-HCCPS-HMW46A-EF43

ID#: 0502106A-10A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**b022410**	**Date of Collection: 2/3/05**	
Dil. Factor:	**5360**	**Date of Analysis: 2/24/05 03:30 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Benzene	2700	16000	8600	52000
Ethyl Benzene	2700	Not Detected	12000	Not Detected
Styrene	2700	Not Detected	11000	Not Detected
Toluene	2700	Not Detected	10000	Not Detected
1,2,4-Trimethylbenzene	2700	Not Detected	13000	Not Detected
1,3,5-Trimethylbenzene	2700	Not Detected	13000	Not Detected
m,p-Xylene	2700	Not Detected	12000	Not Detected
o-Xylene	2700	Not Detected	12000	Not Detected
Cyclohexane	11000	Not Detected	37000	Not Detected
Cyclopentane	11000	18000	31000	51000
2,2-Dimethylbutane	11000	Not Detected	38000	Not Detected
2,3-Dimethylbutane	11000	42000	38000	150000
2,3-Dimethylpentane	11000	29000	44000	120000
2,4-Dimethylpentane	11000	18000	44000	73000
Heptane	11000	Not Detected	44000	Not Detected
Hexane	11000	46000	38000	160000
Isoprene	11000	Not Detected	30000	Not Detected
Cumene	11000	Not Detected	53000	Not Detected
Isopentane	11000	820000	32000	2400000
Methylcyclohexane	11000	Not Detected	43000	Not Detected
Methylcyclopentane	11000	34000	37000	120000
2-Methylheptane	11000	Not Detected	50000	Not Detected
3-Methylheptane	11000	Not Detected	50000	Not Detected
2-Methylhexane	11000	16000	44000	64000
3-Methylhexane	11000	19000	44000	78000
2-Methylpentane	11000	140000	38000	480000
3-Methylpentane	11000	80000	38000	280000
Nonane	11000	Not Detected	56000	Not Detected
Octane	11000	Not Detected	50000	Not Detected
Pentane	11000	290000	32000	850000
1-Pentene	11000	Not Detected	31000	Not Detected
cis-2-Pentene	11000	Not Detected	31000	Not Detected
trans-2-Pentene	11000	Not Detected	31000	Not Detected
Propylbenzene	11000	Not Detected	53000	Not Detected
2,2,4-Trimethylpentane	11000	22000	50000	100000
2,3,4-Trimethylpentane	11000	Not Detected	50000	Not Detected
1-Hexene	11000	Not Detected	37000	Not Detected
3-Ethyltoluene	11000	Not Detected	53000	Not Detected
4-Ethyltoluene	11000	Not Detected	53000	Not Detected
2-Ethyltoluene	11000	Not Detected	53000	Not Detected
Decane	11000	Not Detected	62000	Not Detected
1,2,3-Trimethylbenzene	11000	Not Detected	53000	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 020305-HCCPS-HMW46A-EF43

ID#: 0502106A-10A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**b022410**	**Date of Collection: 2/3/05**	
Dil. Factor:	**5360**	**Date of Analysis: 2/24/05 03:30 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
1,3-Diethylbenzene	11000	Not Detected	59000	Not Detected
1,4-Diethylbenzene	11000	Not Detected	59000	Not Detected
Undecane	11000	Not Detected	68000	Not Detected
cis-2-Hexene	27000	Not Detected	92000	Not Detected
trans-2-Hexene	27000	Not Detected	92000	Not Detected
alpha-Pinene	27000	Not Detected	150000	Not Detected
beta-Pinene	27000	Not Detected	150000	Not Detected
Cyclopentene	11000	Not Detected	30000	Not Detected
1-Undecene	27000	Not Detected	170000	Not Detected
1-Decene	27000	Not Detected	150000	Not Detected
1-Nonene	11000	Not Detected	55000	Not Detected
1-Octene	11000	Not Detected	49000	Not Detected
1-Heptene	11000	Not Detected	43000	Not Detected
1,3-Butadiene	2700	Not Detected	5900	Not Detected
TPH ref. to Gasoline (MW=100)	54000	1600000	220000	6500000

TENTATIVELY IDENTIFIED COMPOUNDS

Compound	CAS Number	Match Quality	Amount ppbv
Dodecane	112-40-3	NA	Not Detected
1-Dodecene	112-41-4	NA	Not Detected
Tridecane	629-50-5	NA	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	91	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	107	70-130

AIR TOXICS LTD.

SAMPLE NAME: 020305-HCCPS-HMW46A-EF43 Duplicate

ID#: 0502106A-10AA

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	b022411	Date of Collection:	2/3/05
Dil. Factor:	5360	Date of Analysis:	2/24/05 04:39 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Benzene	2700	15000	8600	48000
Ethyl Benzene	2700	Not Detected	12000	Not Detected
Styrene	2700	Not Detected	11000	Not Detected
Toluene	2700	Not Detected	10000	Not Detected
1,2,4-Trimethylbenzene	2700	Not Detected	13000	Not Detected
1,3,5-Trimethylbenzene	2700	Not Detected	13000	Not Detected
m,p-Xylene	2700	Not Detected	12000	Not Detected
o-Xylene	2700	Not Detected	12000	Not Detected
Cyclohexane	11000	Not Detected	37000	Not Detected
Cyclopentane	11000	16000	31000	47000
2,2-Dimethylbutane	11000	Not Detected	38000	Not Detected
2,3-Dimethylbutane	11000	39000	38000	140000
2,3-Dimethylpentane	11000	27000	44000	110000
2,4-Dimethylpentane	11000	18000	44000	72000
Heptane	11000	Not Detected	44000	Not Detected
Hexane	11000	41000	38000	140000
Isoprene	11000	Not Detected	30000	Not Detected
Cumene	11000	Not Detected	53000	Not Detected
Isopentane	11000	790000	32000	2300000
Methylcyclohexane	11000	Not Detected	43000	Not Detected
Methylcyclopentane	11000	34000	37000	120000
2-Methylheptane	11000	Not Detected	50000	Not Detected
3-Methylheptane	11000	Not Detected	50000	Not Detected
2-Methylhexane	11000	14000	44000	59000
3-Methylhexane	11000	18000	44000	73000
2-Methylpentane	11000	130000	38000	460000
3-Methylpentane	11000	74000	38000	260000
Nonane	11000	Not Detected	56000	Not Detected
Octane	11000	Not Detected	50000	Not Detected
Pentane	11000	280000	32000	810000
1-Pentene	11000	Not Detected	31000	Not Detected
cis-2-Pentene	11000	Not Detected	31000	Not Detected
trans-2-Pentene	11000	Not Detected	31000	Not Detected
Propylbenzene	11000	Not Detected	53000	Not Detected
2,2,4-Trimethylpentane	11000	20000	50000	95000
2,3,4-Trimethylpentane	11000	Not Detected	50000	Not Detected
1-Hexene	11000	Not Detected	37000	Not Detected
3-Ethyltoluene	11000	Not Detected	53000	Not Detected
4-Ethyltoluene	11000	Not Detected	53000	Not Detected
2-Ethyltoluene	11000	Not Detected	53000	Not Detected
Decane	11000	Not Detected	62000	Not Detected
1,2,3-Trimethylbenzene	11000	Not Detected	53000	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 020305-HCCPS-HMW46A-EF43 Duplicate

ID#: 0502106A-10AA

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**b022411**	**Date of Collection: 2/3/05**	
Dil. Factor:	**5360**	**Date of Analysis: 2/24/05 04:39 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
1,3-Diethylbenzene	11000	Not Detected	59000	Not Detected
1,4-Diethylbenzene	11000	Not Detected	59000	Not Detected
Undecane	11000	Not Detected	68000	Not Detected
cis-2-Hexene	27000	Not Detected	92000	Not Detected
trans-2-Hexene	27000	Not Detected	92000	Not Detected
alpha-Pinene	27000	Not Detected	150000	Not Detected
beta-Pinene	27000	Not Detected	150000	Not Detected
Cyclopentene	11000	Not Detected	30000	Not Detected
1-Undecene	27000	Not Detected	170000	Not Detected
1-Decene	27000	Not Detected	150000	Not Detected
1-Nonene	11000	Not Detected	55000	Not Detected
1-Octene	11000	Not Detected	49000	Not Detected
1-Heptene	11000	Not Detected	43000	Not Detected
1,3-Butadiene	2700	Not Detected	5900	Not Detected
TPH ref. to Gasoline (MW=100)	54000	1500000	220000	6100000

TENTATIVELY IDENTIFIED COMPOUNDS

Compound	CAS Number	Match Quality	Amount ppbv
Dodecane	112-40-3	NA	Not Detected
1-Dodecene	112-41-4	NA	Not Detected
Tridecane	629-50-5	NA	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	92	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	108	70-130

AIR TOXICS LTD.

SAMPLE NAME: 020305-HCCPS-HMW46A-IF43

ID#: 0502106A-11A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**b022321**	**Date of Collection: 2/3/05**	
Dil. Factor:	**179000**	**Date of Analysis: 2/24/05 04:58 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Benzene	90000	430000	280000	1400000
Ethyl Benzene	90000	Not Detected	390000	Not Detected
Styrene	90000	Not Detected	380000	Not Detected
Toluene	90000	Not Detected	340000	Not Detected
1,2,4-Trimethylbenzene	90000	Not Detected	440000	Not Detected
1,3,5-Trimethylbenzene	90000	Not Detected	440000	Not Detected
m,p-Xylene	90000	Not Detected	390000	Not Detected
o-Xylene	90000	Not Detected	390000	Not Detected
Cyclohexane	360000	Not Detected	1200000	Not Detected
Cyclopentane	360000	420000	1000000	1200000
2,2-Dimethylbutane	360000	Not Detected	1300000	Not Detected
2,3-Dimethylbutane	360000	1000000	1300000	3600000
2,3-Dimethylpentane	360000	680000	1500000	2800000
2,4-Dimethylpentane	360000	480000	1500000	2000000
Heptane	360000	Not Detected	1500000	Not Detected
Hexane	360000	1100000	1300000	4000000
Isoprene	360000	Not Detected	1000000	Not Detected
Cumene	360000	Not Detected	1800000	Not Detected
Isopentane	360000	24000000	1000000	71000000
Methylcyclohexane	360000	Not Detected	1400000	Not Detected
Methylcyclopentane	360000	980000	1200000	3400000
2-Methylheptane	360000	Not Detected	1700000	Not Detected
3-Methylheptane	360000	Not Detected	1700000	Not Detected
2-Methylhexane	360000	420000	1500000	1700000
3-Methylhexane	360000	480000	1500000	2000000
2-Methylpentane	360000	3500000	1300000	12000000
3-Methylpentane	360000	2000000	1300000	7000000
Nonane	360000	Not Detected	1900000	Not Detected
Octane	360000	Not Detected	1700000	Not Detected
Pentane	360000	8000000	1000000	24000000
1-Pentene	360000	Not Detected	1000000	Not Detected
cis-2-Pentene	360000	Not Detected	1000000	Not Detected
trans-2-Pentene	360000	Not Detected	1000000	Not Detected
Propylbenzene	360000	Not Detected	1800000	Not Detected
2,2,4-Trimethylpentane	360000	570000	1700000	2700000
2,3,4-Trimethylpentane	360000	Not Detected	1700000	Not Detected
1-Hexene	360000	Not Detected	1200000	Not Detected
3-Ethyltoluene	360000	Not Detected	1800000	Not Detected
4-Ethyltoluene	360000	Not Detected	1800000	Not Detected
2-Ethyltoluene	360000	Not Detected	1800000	Not Detected
Decane	360000	Not Detected	2100000	Not Detected
1,2,3-Trimethylbenzene	360000	Not Detected	1800000	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 020305-HCCPS-HMW46A-IF43

ID#: 0502106A-11A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**b022321**	**Date of Collection: 2/3/05**	
Dil. Factor:	**179000**	**Date of Analysis: 2/24/05 04:58 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
1,3-Diethylbenzene	360000	Not Detected	2000000	Not Detected
1,4-Diethylbenzene	360000	Not Detected	2000000	Not Detected
Undecane	360000	Not Detected	2300000	Not Detected
cis-2-Hexene	900000	Not Detected	3100000	Not Detected
trans-2-Hexene	900000	Not Detected	3100000	Not Detected
alpha-Pinene	900000	Not Detected	5000000	Not Detected
beta-Pinene	900000	Not Detected	5000000	Not Detected
Cyclopentene	360000	Not Detected	1000000	Not Detected
1-Undecene	900000	Not Detected	5600000	Not Detected
1-Decene	900000	Not Detected	5100000	Not Detected
1-Nonene	360000	Not Detected	1800000	Not Detected
1-Octene	360000	Not Detected	1600000	Not Detected
1-Heptene	360000	Not Detected	1400000	Not Detected
1,3-Butadiene	90000	Not Detected	200000	Not Detected
TPH ref. to Gasoline (MW=100)	1800000	36000000	7300000	150000000

TENTATIVELY IDENTIFIED COMPOUNDS

Compound	CAS Number	Match Quality	Amount ppbv
Dodecane	112-40-3	NA	Not Detected
1-Dodecene	112-41-4	NA	Not Detected
Tridecane	629-50-5	NA	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	96	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	119	70-130

AIR TOXICS LTD.

SAMPLE NAME: 020305-HCCPS-HMW46A-EF43

ID#: 0502106C-10A

MODIFIED NATURAL GAS ANALYSIS BY ASTM D-1946

File Name:	9020919	Date of Collection:	2/3/05
Dil. Factor:	1.34	Date of Analysis:	2/10/05 12:44 AM

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.13	20
Methane	0.00013	1.7
Carbon Dioxide	0.013	0.54

Container Type: 6 Liter Summa Canister

AIR TOXICS LTD.

SAMPLE NAME: 020305-HCCPS-HMW46A-EF43 Duplicate

ID#: 0502106C-10AA

MODIFIED NATURAL GAS ANALYSIS BY ASTM D-1946

File Name:	**9020920**	**Date of Collection: 2/3/05**	
Dil. Factor:	**1.34**	**Date of Analysis: 2/10/05 01:19 AM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.13	20
Methane	0.00013	1.7
Carbon Dioxide	0.013	0.54

Container Type: 6 Liter Summa Canister

AIR TOXICS LTD.

SAMPLE NAME: 020305-HCCPS-HMW46A-IF43

ID#: 0502106C-11A

MODIFIED NATURAL GAS ANALYSIS BY ASTM D-1946

File Name:	**9020921**	**Date of Collection: 2/3/05**	
Dil. Factor:	**1.79**	**Date of Analysis: 2/10/05 01:45 AM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.18	0.48
Methane	0.00018	54
Carbon Dioxide	0.018	16

Container Type: 6 Liter Summa Canister

AIR TOXICS LTD.

SAMPLE NAME: 021005-HCCPS-HSVE20-IF

ID#: 0502264A-14A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	b030618	Date of Collection:	2/10/05
Dil. Factor:	34200	Date of Analysis:	3/7/05 09:01 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Benzene	17000	77000	55000	250000
Ethyl Benzene	17000	Not Detected	74000	Not Detected
Styrene	17000	Not Detected	73000	Not Detected
Toluene	17000	Not Detected	64000	Not Detected
1,2,4-Trimethylbenzene	17000	Not Detected	84000	Not Detected
1,3,5-Trimethylbenzene	17000	Not Detected	84000	Not Detected
m,p-Xylene	17000	Not Detected	74000	Not Detected
o-Xylene	17000	Not Detected	74000	Not Detected
Cyclohexane	68000	Not Detected	240000	Not Detected
Cyclopentane	68000	76000	200000	220000
2,2-Dimethylbutane	68000	Not Detected	240000	Not Detected
2,3-Dimethylbutane	68000	180000	240000	640000
2,3-Dimethylpentane	68000	160000	280000	670000
2,4-Dimethylpentane	68000	110000	280000	440000
Heptane	68000	Not Detected	280000	Not Detected
Hexane	68000	Not Detected	240000	Not Detected
Isoprene	68000	Not Detected	190000	Not Detected
Cumene	68000	Not Detected	340000	Not Detected
Isopentane	68000	3400000	200000	10000000
Methylcyclohexane	68000	Not Detected	270000	Not Detected
Methylcyclopentane	68000	180000	240000	620000
2-Methylheptane	68000	Not Detected	320000	Not Detected
3-Methylheptane	68000	Not Detected	320000	Not Detected
2-Methylhexane	68000	Not Detected	280000	Not Detected
3-Methylhexane	68000	73000	280000	300000
2-Methylpentane	68000	500000	240000	1800000
3-Methylpentane	68000	400000	240000	1400000
Nonane	68000	Not Detected	360000	Not Detected
Octane	68000	Not Detected	320000	Not Detected
Pentane	68000	810000	200000	2400000
1-Pentene	68000	Not Detected	200000	Not Detected
cis-2-Pentene	68000	Not Detected	200000	Not Detected
trans-2-Pentene	68000	Not Detected	200000	Not Detected
Propylbenzene	68000	Not Detected	340000	Not Detected
2,2,4-Trimethylpentane	68000	140000	320000	680000
2,3,4-Trimethylpentane	68000	Not Detected	320000	Not Detected
1-Hexene	68000	Not Detected	240000	Not Detected
3-Ethyltoluene	68000	Not Detected	340000	Not Detected
4-Ethyltoluene	68000	Not Detected	340000	Not Detected
2-Ethyltoluene	68000	Not Detected	340000	Not Detected
Decane	68000	Not Detected	400000	Not Detected
1,2,3-Trimethylbenzene	68000	Not Detected	340000	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 021005-HCCPS-HSVE20-IF

ID#: 0502264A-14A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	b030618	Date of Collection:	2/10/05
Dil. Factor:	34200	Date of Analysis:	3/7/05 09:01 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
1,3-Diethylbenzene	68000	Not Detected	370000	Not Detected
1,4-Diethylbenzene	68000	Not Detected	380000	Not Detected
Undecane	68000	Not Detected	440000	Not Detected
cis-2-Hexene	170000	Not Detected	590000	Not Detected
trans-2-Hexene	170000	Not Detected	590000	Not Detected
alpha-Pinene	170000	Not Detected	950000	Not Detected
beta-Pinene	170000	Not Detected	950000	Not Detected
Cyclopentene	68000	Not Detected	190000	Not Detected
1-Undecene	170000	Not Detected	1100000	Not Detected
1-Decene	170000	Not Detected	980000	Not Detected
1-Nonene	68000	Not Detected	350000	Not Detected
1-Octene	68000	Not Detected	310000	Not Detected
1-Heptene	68000	Not Detected	270000	Not Detected
1,3-Butadiene	17000	Not Detected	38000	Not Detected
TPH ref. to Gasoline (MW=100)	340000	4700000	1400000	19000000

TENTATIVELY IDENTIFIED COMPOUNDS

Compound	CAS Number	Match Quality	Amount ppbv
Dodecane	112-40-3	NA	Not Detected
1-Dodecene	112-41-4	NA	Not Detected
Tridecane	629-50-5	NA	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	92	70-130
Toluene-d8	94	70-130
4-Bromofluorobenzene	111	70-130

AIR TOXICS LTD.

SAMPLE NAME: 021005-HCCPS-HSVE20-IF Duplicate

ID#: 0502264A-14AA

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	b030619	Date of Collection:	2/10/05
Dil. Factor:	34200	Date of Analysis:	3/7/05 09:59 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Benzene	17000	73000	55000	230000
Ethyl Benzene	17000	Not Detected	74000	Not Detected
Styrene	17000	Not Detected	73000	Not Detected
Toluene	17000	Not Detected	64000	Not Detected
1,2,4-Trimethylbenzene	17000	Not Detected	84000	Not Detected
1,3,5-Trimethylbenzene	17000	Not Detected	84000	Not Detected
m,p-Xylene	17000	Not Detected	74000	Not Detected
o-Xylene	17000	Not Detected	74000	Not Detected
Cyclohexane	68000	Not Detected	240000	Not Detected
Cyclopentane	68000	72000	200000	210000
2,2-Dimethylbutane	68000	Not Detected	240000	Not Detected
2,3-Dimethylbutane	68000	180000	240000	630000
2,3-Dimethylpentane	68000	160000	280000	640000
2,4-Dimethylpentane	68000	100000	280000	420000
Heptane	68000	Not Detected	280000	Not Detected
Hexane	68000	Not Detected	240000	Not Detected
Isoprene	68000	Not Detected	190000	Not Detected
Cumene	68000	Not Detected	340000	Not Detected
Isopentane	68000	3400000	200000	10000000
Methylcyclohexane	68000	Not Detected	270000	Not Detected
Methylcyclopentane	68000	170000	240000	600000
2-Methylheptane	68000	Not Detected	320000	Not Detected
3-Methylheptane	68000	Not Detected	320000	Not Detected
2-Methylhexane	68000	Not Detected	280000	Not Detected
3-Methylhexane	68000	68000	280000	280000
2-Methylpentane	68000	480000	240000	1700000
3-Methylpentane	68000	390000	240000	1400000
Nonane	68000	Not Detected	360000	Not Detected
Octane	68000	Not Detected	320000	Not Detected
Pentane	68000	770000	200000	2300000
1-Pentene	68000	Not Detected	200000	Not Detected
cis-2-Pentene	68000	Not Detected	200000	Not Detected
trans-2-Pentene	68000	Not Detected	200000	Not Detected
Propylbenzene	68000	Not Detected	340000	Not Detected
2,2,4-Trimethylpentane	68000	140000	320000	660000
2,3,4-Trimethylpentane	68000	Not Detected	320000	Not Detected
1-Hexene	68000	Not Detected	240000	Not Detected
3-Ethyltoluene	68000	Not Detected	340000	Not Detected
4-Ethyltoluene	68000	Not Detected	340000	Not Detected
2-Ethyltoluene	68000	Not Detected	340000	Not Detected
Decane	68000	Not Detected	400000	Not Detected
1,2,3-Trimethylbenzene	68000	Not Detected	340000	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 021005-HCCPS-HSVE20-IF Duplicate

ID#: 0502264A-14AA

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**b030619**	**Date of Collection:**	**2/10/05**
Dil. Factor:	**34200**	**Date of Analysis:**	**3/7/05 09:59 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
1,3-Diethylbenzene	68000	Not Detected	370000	Not Detected
1,4-Diethylbenzene	68000	Not Detected	380000	Not Detected
Undecane	68000	Not Detected	440000	Not Detected
cis-2-Hexene	170000	Not Detected	590000	Not Detected
trans-2-Hexene	170000	Not Detected	590000	Not Detected
alpha-Pinene	170000	Not Detected	950000	Not Detected
beta-Pinene	170000	Not Detected	950000	Not Detected
Cyclopentene	68000	Not Detected	190000	Not Detected
1-Undecene	170000	Not Detected	1100000	Not Detected
1-Decene	170000	Not Detected	980000	Not Detected
1-Nonene	68000	Not Detected	350000	Not Detected
1-Octene	68000	Not Detected	310000	Not Detected
1-Heptene	68000	Not Detected	270000	Not Detected
1,3-Butadiene	17000	Not Detected	38000	Not Detected
TPH ref. to Gasoline (MW=100)	340000	4500000	1400000	18000000

TENTATIVELY IDENTIFIED COMPOUNDS

Compound	CAS Number	Match Quality	Amount ppbv
Dodecane	112-40-3	NA	Not Detected
1-Dodecene	112-41-4	NA	Not Detected
Tridecane	629-50-5	NA	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	95	70-130
Toluene-d8	94	70-130
4-Bromofluorobenzene	112	70-130

AIR TOXICS LTD.

SAMPLE NAME: 021005-HCCPS-HSVE20-EF

ID#: 0502264A-15A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**b030620**	**Date of Collection: 2/10/05**	
Dil. Factor:	**2540**	**Date of Analysis: 3/7/05 10:57 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Benzene	1300	5900	4000	19000
Ethyl Benzene	1300	Not Detected	5500	Not Detected
Styrene	1300	Not Detected	5400	Not Detected
Toluene	1300	6800	4800	26000
1,2,4-Trimethylbenzene	1300	Not Detected	6200	Not Detected
1,3,5-Trimethylbenzene	1300	Not Detected	6200	Not Detected
m,p-Xylene	1300	Not Detected	5500	Not Detected
o-Xylene	1300	Not Detected	5500	Not Detected
Cyclohexane	5100	Not Detected	17000	Not Detected
Cyclopentane	5100	6000	14000	17000
2,2-Dimethylbutane	5100	Not Detected	18000	Not Detected
2,3-Dimethylbutane	5100	15000	18000	53000
2,3-Dimethylpentane	5100	13000	21000	54000
2,4-Dimethylpentane	5100	8300	21000	34000
Heptane	5100	Not Detected	21000	Not Detected
Hexane	5100	Not Detected	18000	Not Detected
Isoprene	5100	Not Detected	14000	Not Detected
Cumene	5100	Not Detected	25000	Not Detected
Isopentane	5100	280000	15000	840000
Methylcyclohexane	5100	Not Detected	20000	Not Detected
Methylcyclopentane	5100	14000	17000	48000
2-Methylheptane	5100	Not Detected	24000	Not Detected
3-Methylheptane	5100	Not Detected	24000	Not Detected
2-Methylhexane	5100	Not Detected	21000	Not Detected
3-Methylhexane	5100	5300	21000	22000
2-Methylpentane	5100	41000	18000	140000
3-Methylpentane	5100	32000	18000	110000
Nonane	5100	Not Detected	27000	Not Detected
Octane	5100	Not Detected	24000	Not Detected
Pentane	5100	69000	15000	200000
1-Pentene	5100	Not Detected	14000	Not Detected
cis-2-Pentene	5100	Not Detected	14000	Not Detected
trans-2-Pentene	5100	Not Detected	14000	Not Detected
Propylbenzene	5100	Not Detected	25000	Not Detected
2,2,4-Trimethylpentane	5100	11000	24000	53000
2,3,4-Trimethylpentane	5100	Not Detected	24000	Not Detected
1-Hexene	5100	Not Detected	17000	Not Detected
3-Ethyltoluene	5100	Not Detected	25000	Not Detected
4-Ethyltoluene	5100	Not Detected	25000	Not Detected
2-Ethyltoluene	5100	Not Detected	25000	Not Detected
Decane	5100	Not Detected	30000	Not Detected
1,2,3-Trimethylbenzene	5100	Not Detected	25000	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 021005-HCCPS-HSVE20-EF

ID#: 0502264A-15A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**b030620**	**Date of Collection: 2/10/05**	
Dil. Factor:	**2540**	**Date of Analysis: 3/7/05 10:57 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
1,3-Diethylbenzene	5100	Not Detected	28000	Not Detected
1,4-Diethylbenzene	5100	Not Detected	28000	Not Detected
Undecane	5100	Not Detected	32000	Not Detected
cis-2-Hexene	13000	Not Detected	44000	Not Detected
trans-2-Hexene	13000	Not Detected	44000	Not Detected
alpha-Pinene	13000	Not Detected	71000	Not Detected
beta-Pinene	13000	Not Detected	71000	Not Detected
Cyclopentene	5100	Not Detected	14000	Not Detected
1-Undecene	13000	Not Detected	80000	Not Detected
1-Decene	13000	Not Detected	73000	Not Detected
1-Nonene	5100	Not Detected	26000	Not Detected
1-Octene	5100	Not Detected	23000	Not Detected
1-Heptene	5100	Not Detected	20000	Not Detected
1,3-Butadiene	1300	Not Detected	2800	Not Detected
TPH ref. to Gasoline (MW=100)	25000	530000	100000	2200000

TENTATIVELY IDENTIFIED COMPOUNDS

Compound	CAS Number	Match Quality	Amount ppbv
Dodecane	112-40-3	87%	7300 N J
1-Dodecene	112-41-4	NA	Not Detected
Tridecane	629-50-5	NA	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	95	70-130
Toluene-d8	94	70-130
4-Bromofluorobenzene	120	70-130

AIR TOXICS LTD.

SAMPLE NAME: 021005-HCCPS-HSVE20-EF Duplicate

ID#: 0502264A-15AA

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	b030621	Date of Collection:	2/10/05
Dil. Factor:	2540	Date of Analysis:	3/7/05 12:06 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Benzene	1300	5800	4000	18000
Ethyl Benzene	1300	Not Detected	5500	Not Detected
Styrene	1300	Not Detected	5400	Not Detected
Toluene	1300	6200	4800	23000
1,2,4-Trimethylbenzene	1300	Not Detected	6200	Not Detected
1,3,5-Trimethylbenzene	1300	Not Detected	6200	Not Detected
m,p-Xylene	1300	Not Detected	5500	Not Detected
o-Xylene	1300	Not Detected	5500	Not Detected
Cyclohexane	5100	Not Detected	17000	Not Detected
Cyclopentane	5100	6100	14000	17000
2,2-Dimethylbutane	5100	Not Detected	18000	Not Detected
2,3-Dimethylbutane	5100	15000	18000	52000
2,3-Dimethylpentane	5100	12000	21000	51000
2,4-Dimethylpentane	5100	8400	21000	34000
Heptane	5100	Not Detected	21000	Not Detected
Hexane	5100	Not Detected	18000	Not Detected
Isoprene	5100	Not Detected	14000	Not Detected
Cumene	5100	Not Detected	25000	Not Detected
Isopentane	5100	280000	15000	830000
Methylcyclohexane	5100	Not Detected	20000	Not Detected
Methylcyclopentane	5100	13000	17000	46000
2-Methylheptane	5100	Not Detected	24000	Not Detected
3-Methylheptane	5100	Not Detected	24000	Not Detected
2-Methylhexane	5100	Not Detected	21000	Not Detected
3-Methylhexane	5100	5400	21000	22000
2-Methylpentane	5100	41000	18000	140000
3-Methylpentane	5100	31000	18000	110000
Nonane	5100	Not Detected	27000	Not Detected
Octane	5100	Not Detected	24000	Not Detected
Pentane	5100	68000	15000	200000
1-Pentene	5100	Not Detected	14000	Not Detected
cis-2-Pentene	5100	Not Detected	14000	Not Detected
trans-2-Pentene	5100	Not Detected	14000	Not Detected
Propylbenzene	5100	Not Detected	25000	Not Detected
2,2,4-Trimethylpentane	5100	11000	24000	52000
2,3,4-Trimethylpentane	5100	Not Detected	24000	Not Detected
1-Hexene	5100	Not Detected	17000	Not Detected
3-Ethyltoluene	5100	Not Detected	25000	Not Detected
4-Ethyltoluene	5100	Not Detected	25000	Not Detected
2-Ethyltoluene	5100	Not Detected	25000	Not Detected
Decane	5100	Not Detected	30000	Not Detected
1,2,3-Trimethylbenzene	5100	Not Detected	25000	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 021005-HCCPS-HSVE20-EF Duplicate

ID#: 0502264A-15AA

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**b030621**	**Date of Collection: 2/10/05**	
Dil. Factor:	**2540**	**Date of Analysis: 3/7/05 12:06 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
1,3-Diethylbenzene	5100	Not Detected	28000	Not Detected
1,4-Diethylbenzene	5100	Not Detected	28000	Not Detected
Undecane	5100	Not Detected	32000	Not Detected
cis-2-Hexene	13000	Not Detected	44000	Not Detected
trans-2-Hexene	13000	Not Detected	44000	Not Detected
alpha-Pinene	13000	Not Detected	71000	Not Detected
beta-Pinene	13000	Not Detected	71000	Not Detected
Cyclopentene	5100	Not Detected	14000	Not Detected
1-Undecene	13000	Not Detected	80000	Not Detected
1-Decene	13000	Not Detected	73000	Not Detected
1-Nonene	5100	Not Detected	26000	Not Detected
1-Octene	5100	Not Detected	23000	Not Detected
1-Heptene	5100	Not Detected	20000	Not Detected
1,3-Butadiene	1300	Not Detected	2800	Not Detected
TPH ref. to Gasoline (MW=100)	25000	460000	100000	1900000

TENTATIVELY IDENTIFIED COMPOUNDS

Compound	CAS Number	Match Quality	Amount ppbv
Dodecane	112-40-3	NA	Not Detected
1-Dodecene	112-41-4	NA	Not Detected
Tridecane	629-50-5	NA	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	95	70-130
Toluene-d8	94	70-130
4-Bromofluorobenzene	120	70-130

AIR TOXICS LTD.

SAMPLE NAME: 021005-HCCPS-HSVE20-EX

ID#: 0502264A-16A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**b030622**	**Date of Collection:**	**2/10/05**
Dil. Factor:	**10.3**	**Date of Analysis:**	**3/7/05 12:55 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Benzene	5.2	94	16	300
Ethyl Benzene	5.2	34	22	140
Styrene	5.2	Not Detected	22	Not Detected
Toluene	5.2	Not Detected	19	Not Detected
1,2,4-Trimethylbenzene	5.2	98	25	480
1,3,5-Trimethylbenzene	5.2	25	25	120
m,p-Xylene	5.2	68	22	300
o-Xylene	5.2	Not Detected	22	Not Detected
Cyclohexane	21	Not Detected	71	Not Detected
Cyclopentane	21	Not Detected	59	Not Detected
2,2-Dimethylbutane	21	Not Detected	73	Not Detected
2,3-Dimethylbutane	21	Not Detected	73	Not Detected
2,3-Dimethylpentane	21	51	84	210
2,4-Dimethylpentane	21	Not Detected	84	Not Detected
Heptane	21	Not Detected	84	Not Detected
Hexane	21	Not Detected	73	Not Detected
Isoprene	21	Not Detected	57	Not Detected
Cumene	21	Not Detected	100	Not Detected
Isopentane	21	Not Detected	61	Not Detected
Methylcyclohexane	21	21	83	86
Methylcyclopentane	21	41	71	140
2-Methylheptane	21	Not Detected	96	Not Detected
3-Methylheptane	21	Not Detected	96	Not Detected
2-Methylhexane	21	Not Detected	84	Not Detected
3-Methylhexane	21	26	84	110
2-Methylpentane	21	56	73	200
3-Methylpentane	21	52	73	180
Nonane	21	Not Detected	110	Not Detected
Octane	21	Not Detected	96	Not Detected
Pentane	21	53	61	160
1-Pentene	21	24	59	68
cis-2-Pentene	21	Not Detected	59	Not Detected
trans-2-Pentene	21	Not Detected	59	Not Detected
Propylbenzene	21	53	100	260
2,2,4-Trimethylpentane	21	43	96	200
2,3,4-Trimethylpentane	21	Not Detected	96	Not Detected
1-Hexene	21	23	71	79
3-Ethyltoluene	21	Not Detected	100	Not Detected
4-Ethyltoluene	21	28	100	140
2-Ethyltoluene	21	35	100	170
Decane	21	Not Detected	120	Not Detected
1,2,3-Trimethylbenzene	21	38	100	180

AIR TOXICS LTD.

SAMPLE NAME: 021005-HCCPS-HSVE20-EX

ID#: 0502264A-16A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**b030622**	**Date of Collection:**	**2/10/05**
Dil. Factor:	**10.3**	**Date of Analysis:**	**3/7/05 12:55 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
1,3-Diethylbenzene	21	32	110	180
1,4-Diethylbenzene	21	48	110	260
Undecane	21	Not Detected	130	Not Detected
cis-2-Hexene	52	Not Detected	180	Not Detected
trans-2-Hexene	52	Not Detected	180	Not Detected
alpha-Pinene	52	Not Detected	290	Not Detected
beta-Pinene	52	Not Detected	290	Not Detected
Cyclopentene	21	Not Detected	57	Not Detected
1-Undecene	52	Not Detected	320	Not Detected
1-Decene	52	Not Detected	300	Not Detected
1-Nonene	21	Not Detected	110	Not Detected
1-Octene	21	Not Detected	94	Not Detected
1-Heptene	21	Not Detected	83	Not Detected
1,3-Butadiene	5.2	Not Detected	11	Not Detected
TPH ref. to Gasoline (MW=100)	100	6000	420	24000

TENTATIVELY IDENTIFIED COMPOUNDS

Compound	CAS Number	Match Quality	Amount ppbv
Dodecane	112-40-3	NA	Not Detected
1-Dodecene	112-41-4	NA	Not Detected
Tridecane	629-50-5	NA	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	93	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	112	70-130

AIR TOXICS LTD.

SAMPLE NAME: 021005-HCCPS-HSVE20-IF

ID#: 0502264B-14A

MODIFIED TO-14A

File Name:	**e021521b**	**Date of Collection: 2/10/05**	
Dil. Factor:	**137**	**Date of Analysis: 2/16/05 12:12 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Isobutane	270	540000	650	1300000
Butane	680	1300000	1600	3000000
trans-2-butene	270	4000	630	9300
1-Butene	270	380	630	880
cis-2-Butene	270	1600	630	3700
Acetylene	680	Not Detected	730	Not Detected
Ethene	680	Not Detected	780	Not Detected
Propane	680	8200	1200	15000
Ethane	680	12000	840	15000
Propylene	680	Not Detected	1200	Not Detected

Container Type: 6 Liter Summa Canister

AIR TOXICS LTD.

SAMPLE NAME: 021005-HCCPS-HSVE20-IF Duplicate

ID#: 0502264B-14AA

MODIFIED TO-14A

File Name:	**e021522b**	**Date of Collection: 2/10/05**	
Dil. Factor:	**137**	**Date of Analysis: 2/16/05 12:45 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Isobutane	270	550000	650	1300000
Butane	680	1300000	1600	3000000
trans-2-butene	270	4000	630	9200
1-Butene	270	360	630	840
cis-2-Butene	270	1600	630	3600
Acetylene	680	Not Detected	730	Not Detected
Ethene	680	Not Detected	780	Not Detected
Propane	680	8200	1200	15000
Ethane	680	12000	840	15000
Propylene	680	Not Detected	1200	Not Detected

Container Type: 6 Liter Summa Canister

AIR TOXICS LTD.

SAMPLE NAME: 021005-HCCPS-HSVE20-EF

ID#: 0502264B-15A

MODIFIED TO-14A

File Name:	**e021523b**	**Date of Collection: 2/10/05**	
Dil. Factor:	**11.0**	**Date of Analysis: 2/16/05 01:12 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Isobutane	22	47000	52	110000
Butane	55	110000	130	260000
trans-2-butene	22	350	50	810
1-Butene	22	33	50	76
cis-2-Butene	22	140	50	320
Acetylene	55	Not Detected	58	Not Detected
Ethene	55	Not Detected	63	Not Detected
Propane	55	760	99	1400
Ethane	55	1100	68	1400
Propylene	55	Not Detected	95	Not Detected

Container Type: 6 Liter Summa Canister

AIR TOXICS LTD.

SAMPLE NAME: 021005-HCCPS-HSVE20-EX

ID#: 0502264B-16A

MODIFIED TO-14A

File Name:	**e021517b**	**Date of Collection: 2/10/05**	
Dil. Factor:	**1.29**	**Date of Analysis: 2/15/05 04:52 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Isobutane	2.6	14	6.1	32
Butane	6.4	42	15	99
trans-2-butene	2.6	6.1	5.9	14
1-Butene	2.6	38	5.9	88
cis-2-Butene	2.6	4.4	5.9	10
Acetylene	6.4	17	6.9	18
Ethene	6.4	290	7.4	330
Propane	6.4	500	12	900
Ethane	6.4	7.4	7.9	9.1
Propylene	6.4	160	11	270

Container Type: 6 Liter Summa Canister (SIM Certified)

AIR TOXICS LTD.

SAMPLE NAME: 021005-HCCPS-HSVE20-IF

ID#: 0502264C-14A

MODIFIED NATURAL GAS ANALYSIS BY ASTM D-1946

File Name:	**9021421**	**Date of Collection:**	**2/10/05**
Dil. Factor:	**1.71**	**Date of Analysis:**	**2/14/05 01:57 PM**

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.17	13
Methane	0.00017	6.8
Carbon Dioxide	0.017	5.4

Container Type: 6 Liter Summa Canister

AIR TOXICS LTD.

SAMPLE NAME: 021005-HCCPS-HSVE20-EF

ID#: 0502264C-15A

MODIFIED NATURAL GAS ANALYSIS BY ASTM D-1946

File Name:	**9021422**	**Date of Collection: 2/10/05**	
Dil. Factor:	**1.27**	**Date of Analysis: 2/14/05 02:19 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.13	21
Methane	0.00013	0.56
Carbon Dioxide	0.013	0.48

Container Type: 6 Liter Summa Canister

AIR TOXICS LTD.

SAMPLE NAME: 021005-HCCPS-HSVE20-EF Duplicate

ID#: 0502264C-15AA

MODIFIED NATURAL GAS ANALYSIS BY ASTM D-1946

File Name:	**9021424**	**Date of Collection: 2/10/05**	
Dil. Factor:	**1.27**	**Date of Analysis: 2/14/05 03:07 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.13	21
Methane	0.00013	0.56
Carbon Dioxide	0.013	0.48

Container Type: 6 Liter Summa Canister

AIR TOXICS LTD.

SAMPLE NAME: 021005-HCCPS-HSVE20-EX

ID#: 0502264C-16A

MODIFIED NATURAL GAS ANALYSIS BY ASTM D-1946

File Name:	**9021423**	**Date of Collection:**	**2/10/05**
Dil. Factor:	**1.29**	**Date of Analysis:**	**2/14/05 02:45 PM**

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.13	16
Methane	0.00013	Not Detected
Carbon Dioxide	0.013	3.5

Container Type: 6 Liter Summa Canister (SIM Certified)

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Clayton Group Services**
Client Project ID: **Hartford Working Group/15-03095.13-002** CAS Project ID: P2500859

Total Petroleum Hydrocarbon (TPH)

Test Code: Modified EPA TO-3 Date Collected: 4/21/05
Instrument ID: HP5890 II/GC11/FID Date Received: 4/22/05
Analyst: Regan Lau Date Analyzed: 4/22/05
Sampling Media: Tedlar Bag(s) Volume(s) Analyzed: 1.00 ml
Test Notes: 0.10 ml

Client Sample ID	CAS Sample ID	D. F.	Total Petroleum Hydrocarbons as Gasoline				Data Qualifier
			Result mg/m³	MRL mg/m³	**Result** ppmV	MRL ppmV	
Influent	P2500859-001	1.00	**59,000**	180	**17,000**	51	
Influent	P2500859-001DUP	1.00	**59,000**	180	**17,000**	51	
Method Blank	P050422-MB	1.00	ND	18	ND	5.1	

Parts Per Million Results Are Based on a Molecular Weight of 86.18
ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Clayton Group Services**
Client Project ID: **Hartford Working Group - SVE System/15-03095.13-002** CAS Project ID: P2501008

Total Petroleum Hydrocarbon (TPH)

Test Code: Modified EPA TO-3 Date Collected: 5/11/05
Instrument ID: HP5890 II/GC11/FID Date Received: 5/12/05
Analyst: Regan Lau Date Analyzed: 5/18/05
Sampling Media: Summa Canister(s) Volume(s) Analyzed: 1.00 ml
Test Notes: 0.10 ml

Client Sample ID	CAS Sample ID	D. F.	Total Petroleum Hydrocarbons as Gasoline				Data Qualifier
			Result	MRL	**Result**	MRL	
			mg/m³	mg/m³	**ppmV**	ppmV	
SVE Influent	P2501008-001	1.70	**40,000**	310	**11,000**	87	
TO-1 Influent	P2501008-002	1.17	**23,000**	210	**6,600**	60	
TO-1 Exhaust	P2501008-003	1.32	ND	24	ND	6.7	
Method Blank	P050518-MB	1.00	ND	18	ND	5.1	

Parts Per Million Results Are Based on a Molecular Weight of 86.18
ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____